



**US Army Natick Soldier Research,  
Development, and Engineering Center**



# **Expeditionary Basecamp Passive Protection**

**JOCOTAS, 3 November 2011**

**Nicholas Tino, Mechanical Engineer**

NSRDEC, Shelter Technology, Engineering, and Fabrication Directorate (STEFD)  
Special Projects Team

Unclassified

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>03 NOV 2011</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2011 to 00-00-2011</b>	
4. TITLE AND SUBTITLE <b>Expeditionary Basecamp Passive Protection</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>US Army Research, Development and Engineering Command (RDECOM),US Army Natick Soldier RD&amp;E Center,Natick,MA,01760</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>7th Bi-Annual DOD JOCOTAS Meeting with Rigid &amp; Soft Wall Shelter Industry &amp; Indoor &amp; Outdoor Exhibition, 1-3 Nov 2011, Panama City Beach, FL</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>11</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

**Warfighters in highly mobile forward units have no inherent ballistic protection in shelters and no time/manpower to install traditional ballistic protection (sandbags, concrete barriers). Multiple requests for ballistic protection for shelters have been received from theater.**



**Creating a low cost ballistic solution requires advancing current material technology, systems integration, and manufacturing processes.**

## *The Solution:* Modular Ballistic Protection System (MBPS)

- Rapidly deployable ballistic protection
- Expeditionary protection from multiple ballistic threats
- Lightweight, Low Cost
- Redeployable (install around 32' x 21' 1/4 man-hours)
- No Material Handling Equipment or special tools
- Immediate protection in all battlefield environments
- Withstands high impulse blast overpressures



**NO TOOLS or MHE**



**MBPS** has evolved into a stand-alone ballistic protection system.

- Universal protection for shelters, equipment, supplies, or personnel.
- Can provide a quickly deployed protective fighting position.
- Effectively withstands blast loads in a multitude of soil conditions.

**Current Prototypes:**

**Weight:** 3.8 lbs/sq.ft.

**Thickness:** 0.4 inches

**Cost:** \$20 per sq.ft.

**Protection:** Fragmentation & Ballistic.

**Protection levels can be tailored to need.**

## ARENA TESTING



## BLAST OVERPRESSURE TESTING



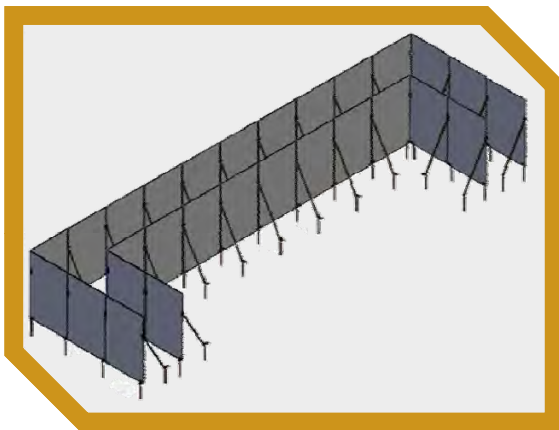
**0.4" thick**





## Up-armoring

Layering & Metallic Strike Face

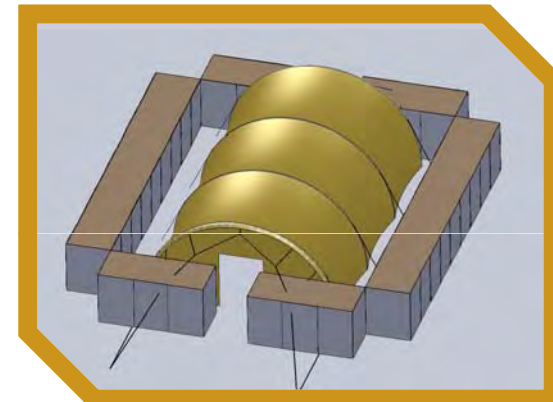


Higher levels of protection have been requested, multiple uparmor solutions possible:

- Metallic strike face add-on
- System layering approach
- Higher cost materials

## 2G Prototype

Anchorless & Fillable



Second generation **MBPS** concepts are in development:

- Anchorless design
- Two layer design, ability to fill if possible/needed.

## Flexible Solution for Air-supported Shelters



Through the **Small Business Innovative Research (SBIR)** program, a flexible ballistic solution was sought for an approach to protect shelters with unique arc shapes of non-traditional frame shelters.

### **NSRDEC Objectives:**

- Provide a level of protection against small arms and fragmenting munitions.
- Low volume pack.
- Utilize unique blast response over rigid solutions.

### **Phase II SBIR:**

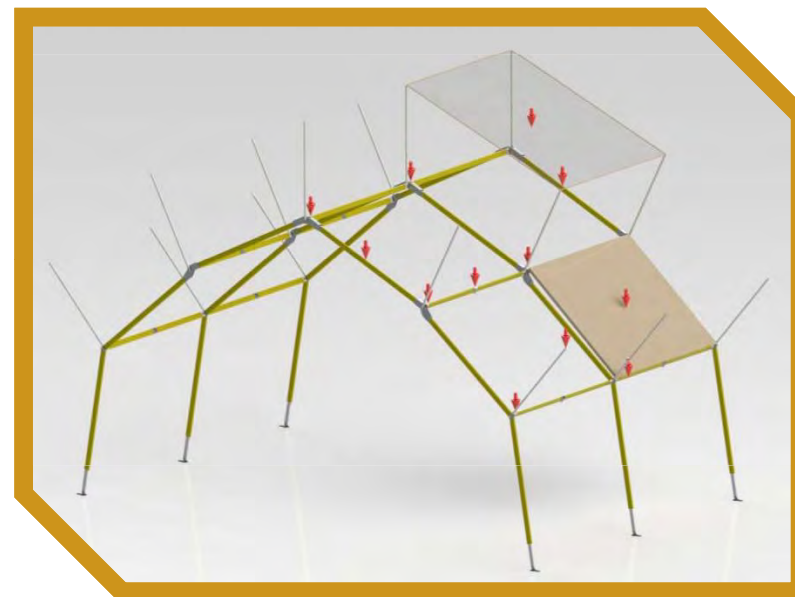


## Overhead Threat Protection (OTP)

The task of developing an Overhead Threat Protection (OTP) system for direct hit survivability is also being pursued through the **Small Business Innovative Research (SBIR)** program.

### NSRDEC Objectives:

- Quickly set up/deployed
- Reusable/redeployable
- Support the weight of ballistic paneling and pre-detonation layer at a stand-off
- Withstand large dynamic (impulse) loading
- Minimal deflection into the covered volume.



### Phase II SBIR:



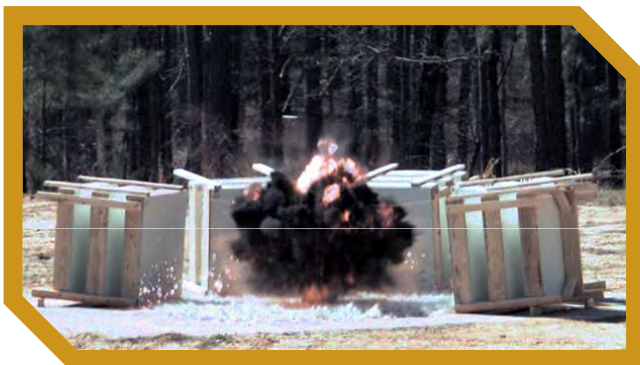


## Ballistic Requirement

- Meets requirement document specified fragmentation protection capability (Note: Can be tailored to need and utilize same system)
- Performs well against relevant munitions in arena testing and modeling

## General Performance Requirements

- Man-portable, No Heavy Equipment, No Special Tools
- Transportability: Tricon or 463L pallet (10,000 lb limit)
- Deployment / Strike times: 1 hour / 4 warfighters / 32'x21' shelter
- Extreme Climates: Temperature, Snow, Wind.
- Panel Durability: Impact Testing, Accelerated Weathering (UV, Water Absorption), Fire Resistance.



Unclassified





# Program Status



- **REF 10 liner**
  - 2 MBPS SA systems in theater
- **Tech Transition**
  - Transition partner PM Force Sustainment Systems (PM FSS)
  - Moving forward with Stand Alone design only
  - Milestone A signed in 1QFY11
  - Milestone B tied to requirements document, awaiting Force Provider Expeditionary (FPE) CPD signature.
- **Test community IPT established**
- **NSN and Interim Tech Manual established with NSRDEC Quick Reaction Cell (QRC) funding**
- **Sponsoring Threat Summit**
  - Participants: ARL, NGIC, ATEC, AWG, NSRDEC, PM FSS



# Partnerships



- Product Manager Force Sustainment Systems (PM FSS)
- AEWC Advanced Structures and Composites Center at the University of Maine - Orono
- National Ground Intelligence Command (NGIC)
- Army Test and Evaluation Command (ATEC)
- NSRDEC - Quick Reaction Cell (QRC)
- Army Corps of Engineers (ERDC)
- Air Force Research Lab (AFRL)
- Army Research Lab (ARL)
- NSRDEC - Ballistic Technology Team (WARPAD Directorate)
- Technical Products Inc. (TPI)
- Tex Tech Industries





# Questions?



## POCs

Nicholas Tino

[nicholas.tino@us.army.mil](mailto:nicholas.tino@us.army.mil)

508.233.5930

Karen Horak

[karen.horak@us.army.mil](mailto:karen.horak@us.army.mil)

508.233.4763

Laura Biszko

[laura.biszko@us.army.mil](mailto:laura.biszko@us.army.mil)

508.233.4499